10/520985

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(43) International Publication Date 22 January 2004 (22.01.2004)

PCT

(10) International Publication Number WO 2004/008380 A1

(51) International Patent Classification7: G06K 9/00

(21) International Application Number:

PCT/IL2003/000567

(22) International Filing Date: 9 July 2003 (09.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 60/395,086

10 July 2002 (10.07.2002) US

(71) Applicant (for all designated States except US): DIGITAL VERIFICATION LTD. [IL/IL]; P.O. Box 7518, 49170 Petah Tikva (IL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): BADAEV, Ilya

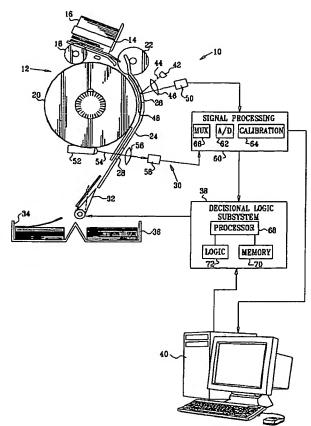
[IL/IL]; 5 Danker Street, Apt.4, 42276 Netanya (IL). EISENBERG, Ioulia [IL/IL]; 9 Kaplan Street, Apt. 3, 49451 Petach Tikva (IL). KOGAN, Leonid [IL/IL]; 4 Beery Str., Apt. 4, 76352 Rehovot (IL). KUGEL, Alexander [IL/IL]; 22B Nizza Boulevard, Apt. 26, 42262 Netanya (IL). STERKIN, Alexander [IL/IL]; 29 Weizmann Street, 76282 Rehovot (IL). POTIKHA, Lev [IL/IL]; 10 Bareket Street, 49517 Petach Tikva (IL). SLEPYAN, Edward [IL/IL]; 96 Gilboa Street, 44851 Alfey Menashe (IL). ZAKHAROV, Michael [IL/IL]; 8 Yona Hanavi Street, 63302 Tel-Aviv (IL).

(74) Agent: SANFORD, T. COLB & CO.; P.O. Box 2273, 76122 Rehovot (IL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,

[Continued on next page]

(54) Title: RECOGNITION OF BANKNOTE DENOMINATIONS IN AUTOMATIC MONEY PROCESSING



(57) Abstract: Methods and systems are provided for the identification of banknotes using a process that comprises two stages. During training, a set of discriminators is developed using a training set of banknotes, which is representative of banknotes of different issuers and denominations. During an operational phase a scanned image of a banknote (26) to be identified is correlated or compared with different members of the set of discriminators. The results of the correlations and comparisons are fed to a decision making module (38) that either generates an identification code for the banknote (26), or reports an unknown banknote. Images of the banknotes are acquired at a spatial resolution as low as 10 dots per inch. At this resolution, the discrimination tables are reduced to masks (134, 136) and the discrimination process is rapidly completed using simple logical or integer arithmetic operations.

WO 2004/008380 A1



SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

- 1

SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.